



Thwarting oil-pipeline corrosion by identifying nanoscale villains



RUST NEVER SLEEPS — Katherine Jungjohann, principal investigator and lead microscopist for a study that pinpointed a major cause of corrosion in pipelines, looks for corrosion with a new Transmission Electron Microscope at the Center for Integrated Technologies. The gas valves on the shelves at left produce different testing environments.

Photo by Randy Montoya

By **Neal Singer**

Steel pipes rust and eventually fail. Therefore, oil companies and others have created computer models to predict when replacement is needed.

But if the models themselves go wrong, they can be modified only through experience, a costly problem if detection comes too late.

Now researchers at Sandia, the DOE Center for Integrated Nanotechnologies and the Aramco Research Center in Boston have found that a particular form of nanoscale corrosion can cause variations in material longevity that unpredictably decrease the working life of steel pipes, according to a recent paper in *Nature's Materials Degradation* journal.

Using a variety of CINT's transmission electron microscopes, which shoot electrons through targets to take pictures, the researchers were able to pin the root of the problem on a triple junction formed by a grain of cementite — a compound of carbon and iron — and two grains of ferrite, a type of iron. The junction frequently forms during most methods of fashioning steel pipe.

The researchers found that interfacial disorder in the atomic structure of those triple junctions made it easier for the corrosive solution to remove iron atoms along that interface.

— CONTINUED ON PAGE 4

UNM collaboration bolsters national security, science

Sandia, university partnership allows institutions to share knowledge

By **Michael J. Baker**

Sandia and the University of New Mexico are joining forces to bolster national security and advance science and engineering under an agreement signed earlier this month.

“Once we have that umbrella in place, it opens the knowledge cache of both institutions — our scientific researchers collaborating with UNM’s — so that we can better serve Albuquerque, the state and the nation,” said Sandia business development specialist Jason Martinez.

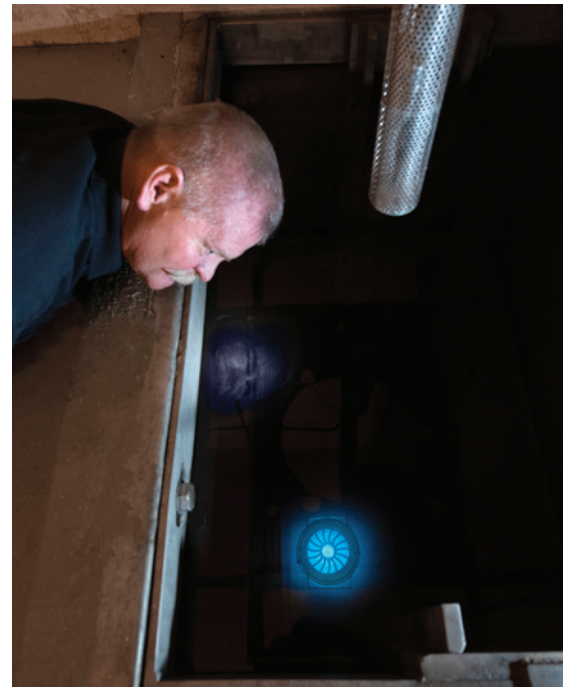
The umbrella Cooperative Research and Development Agreement, or CRADA, allows the Labs and university to explore research collaborations among scientists, faculty and students in several areas, including ongoing projects. In contrast to a standard CRADA, which involves a single

project in one technical area, an umbrella CRADA covers multiple projects and technologies.

The CRADA with UNM will immediately launch two projects focusing on radiation testing and developing particle detector designs for the European particle physics laboratory CERN.

“CRADA research like this fosters innovation and furthers the capabilities of both parties,” said Sandia technology partnerships senior manager Mary Monson. “These partnerships allow Sandia to share our expertise for the U.S. public good and support the Labs’ various missions.”

The CRADA will last five years and can be renewed. The agreement bolsters the collaboration the Labs and UNM have had as part of the Sandia Academic Alliance Program, an initiative formed with five universities to promote



RAD TEST — Technologist Don Hanson looks down at the shutter assembly of Sandia's Gamma Irradiation Facility prior to activation for an experiment. The GIF will help test UNM components for the Large Hadron Collider at CERN, the world's largest and most powerful particle accelerator.

Photo by Randy Montoya

— CONTINUED ON PAGE 3



A day in the life of Sandia — 70 years and counting

To mark the 70th anniversary of President Truman's letter that inspired Sandia to “... exceptional service,” Lab News photographer Randy Montoya spent a full day chronicling the people and work that make the Labs hum from sun up to sundown.

See Randy's photos and personal essay beginning on page 5.

MY SANDIA STORY

Finding a sense of belonging at Sandia

By Anup Singh

When I started my Sandia journey 23 years ago, I didn’t really feel like I belonged. I knew I was capable enough to be at Sandia. In terms of technical skills and knowledge, I was confident from day one that I could make a valuable contribution.

The research was extremely interesting, and I was surrounded by amazing colleagues. Sandia was — and is — a wonderful place to work.

But I just had this sense that culturally, I did not belong at Sandia.

A tale of two Anups

Although I can’t point to a particular event that made me feel this way, there were likely many factors that shaped my feelings of exclusion.

For example, the fields of nuclear weapons and national security have historically been dominated by white males, and I didn’t see any Asian Americans at the highest levels of leadership at Sandia. People seemed to scrutinize my foreign national identification badge. And once I became a U.S. citizen, I had to wait much longer than my coworkers before receiving a security clearance.

This led me to have two personalities. In essence, there were two Anups: Indian American Anup and Sandian Anup. And I deliberately kept them separate.

I did not bring Indian American Anup to work because I was trying to fit in. Instead, I would watch and observe how other people behaved and then try to emulate them instead of being myself.

Yet it always bothered me somewhere deep down that I wasn’t bringing all of me to work.

Nearly seven years into my Sandia career, I was invited to present at the 2003 Fall Leadership Forum. Former California Laboratory vice president Rick Stulen, who was

a director at the time, helped me prepare.

I will always remember Rick’s encouragement: “Before you begin your technical presentation, why don’t you talk about yourself? Why don’t you tell how you came to Sandia?”

The idea made me uncomfortable. But Rick was supportive, and I looked up to him. So I titled my first slide, “From India to Sandia,” and included a world map with a white line chalked across the globe depicting my westward journey from Patna in eastern India (where I was born) to Mumbai (on India’s west coast, where I completed my undergraduate studies) to Raleigh, North Carolina (where I completed my PhD at North Carolina State University), to Sandia/California in Livermore.

That slide ended up receiving the most attention — far more than my technical slides. Many of the people who approached me afterward talked about how they resonated with my experience. None were from India; however, many had similar stories about their journeys and experiences at the Laboratories.

On that day, I realized that I was different, but not that different from others at Sandia. In fact, I learned that I am Sandia. And Sandia is me. From then on, I believed that I belonged at Sandia. I was no longer someone looking in from the outside.

The turning point took place more than 15 years ago and is one of the big reasons why I am still at Sandia today.

Looking back, I appreciate what a difference Rick — and others like him, such as Len Napolitano, Greg Thomas and Mim John — made in my formative years at Sandia. Using their powers as leaders at Sandia, they were my allies and sponsors, helping me bring my full contribution to the Labs as one Anup, not two.

As I have become more comfortable with my place at Sandia and have moved into leadership roles, I have taken the opportunity to do the same for others.

That said, I’d like to ask each of you to consider how you can be an ally to your fellow Sandians. Are there steps you can take to help others bring



DETECT AND SPIN — Anup (right) examines an early version of the SpinDx bio-threat detection instrument with collaborators Matt Ciccini (left) and Chung-Yan Koh. Photo by Randy Wong

their best selves to Sandia and fully contribute to our mission?

As we celebrate Asian American and Pacific Islander Heritage Month in May, I want all workforce members to feel a sense of belonging at the Laboratories. At Sandia, our strength comes from our diversity.

If you have similar concerns as I did during my early years at Sandia, please speak openly with your colleagues or your manager. You can also meet with me if I can help in any way.


Everyone has a role to play in creating a culture of diversity and inclusion. We must all seek to better understand and respect our colleagues’ individual and cultural differences.

I encourage each of us to have similar conversations with our children and in our communities, especially given some of the current negative political discourse in the country that disdains immigrants.

Attracting diverse talent to Sandia

Finally, to attract the best talent to come and work at Sandia, we must help minorities see Sandia as a place where all are welcome and can bring their whole selves to work.

There are many groups that typically do not associate with or feel like they belong in the national security complex. Their absence hinders our work.

Women, Asian Americans, African Americans, Latinos and other minorities have a lot to contribute, and we must do more to attract and retain diverse talent, no matter their cultural or ethnic background. 

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| | |
|-------------------------------------|--------------|
| Jim Danneskiold, Acting Editor | 505-844-0587 |
| Darrick Hurst, Managing Editor | 505-844-8009 |
| Laura Hatfield, Production | 505-845-0612 |
| Angela Barr, Production | 505-844-1388 |
| Tim Deshler, Production and Web | 505-844-2502 |
| Randy Montoya, Photographer | 505-844-5605 |
| Paul Rhien, California Site Contact | 925-294-6452 |

CONTRIBUTORS

Michelle Fleming (ads, milepost photos, 505-844-4902),
Neal Singer (505-846-7078), Stephanie Holinka (505-284-9227),
Kristen Meub (505-845-7215), Michael Baker (505-284-1085),
Troy Rummler (505-284-1056), Manette Fisher (505-844-1742),
Valerie Alba (505-284-7879), Meagan Brace (505-844-0499),
Melissae Fellet (505-845-7478), Lucian Frank (505-844-2020),
Jim Danneskiold, manager (505-844-0587)

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HIGH-LEVEL GREETINGS — DOE Deputy Secretary Dan Brouillette visited Sandia recently and received updates on nuclear weapons life-extension programs, robotics and a wide range of other Sandia programs. Getting acquainted are (left to right) Lt. Gen. Richard Clarke, director for Strategy, Plans, and Policy for the Joint Chiefs of Staff; Brouillette; U.S. Navy Capt. Lawrence LeGree, DOE senior adviser for nuclear affairs in the deputy secretary’s office; Labs Director Steve Younger and Sandia Field Office Manager Jeff Harrell. Photo by Lonnie Anderson

Interns race to victory at Chem-E-Car competition

A team of hot-rodding, car constructing interns from Sandia took first place in the annual Chem-E-Car competition last month at the Colorado School of Mines in Golden.

The mission, for the 13 college teams that chose to accept it, was to carry a load of water a specified distance randomly selected an hour prior to the competition. The team that came closest to the finish line would win.

The competition was part of the 2019 American Institute of Chemical Engineers Rocky Mountain regional conference.

The UNM team got closest, rolling to a stop just 1.77 feet short of the finish line, with the second-place team more than three feet back from the line. UNM also finished in the fastest time, and captured third place for their poster.

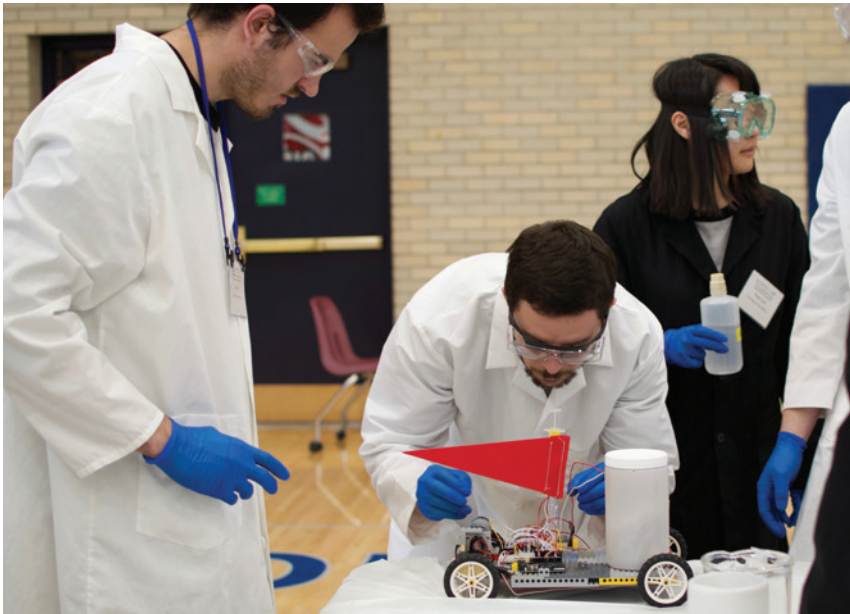
The Sandia interns devised batteries that used aluminum foil and activated carbon to propel the car. To stop the car at the right spot, they built an iodine clock from iodine tincture, hydrogen peroxide, cornstarch and Vitamin C tablets.

Sandia student interns on the winning team from UNM included Ryan Hill, Derek Nelson, Rebecca Tafoya and Rose Lee. Forrest Cheek of UNM also was part of the team.

Derek and Ryan work in the Integrated Materials Laboratory and Rebecca and Rose work at the Sandia/UNM Advanced Materials Laboratory, whose research focuses on the synthesis and characterization of materials and on processing and manufacturing, often for energy-related solutions and technologies.

“Last year, the AIChE UNM student chapter didn’t even have a Chem-E-Car team,” David Arnot, UNM AIChE vice president, told a UNM reporter. “Typically, other schools just refurbish and recycle cars from previous years, so it was a huge accomplishment to have won the regional competition with a car made from scratch.”

The Lobo vehicle qualified for the national competition in November in Orlando, Florida, where it will compete with cars from around the world. [!\[\]\(d3102649f02e825ddb76dc3de0190154_img.jpg\)](#)



BETTER RACING THROUGH CHEMISTRY — A team of Sandia interns from the University of New Mexico took top honors at the annual regional Chem-E-Car race sponsored by the American Institute of Chemical Engineers. Posing with the winning racer are (left to right) Rose Lee, Rebecca Tafoya, Ryan Hill, Forrest Cheek, who is the sole UNM team member not at Sandia, and Derek Nelson.

Photos courtesy of the Colorado School of Mines

UNM CRADA research pact

CONTINUED FROM PAGE 1

collaborative research and attract top talent to work on these tough problems.

The agreement with UNM could serve as a model for other Academic Alliance partners, said Diane Peebles, Sandia’s New Mexico partnership manager. Sandia’s other Academic Alliance partners are the Georgia Institute of Technology, the University of Illinois at Urbana-Champaign, Purdue University and the University of Texas at Austin.

The UNM umbrella CRADA has nine areas of collaboration: quantum information science; computational science and engineering; cybersecurity; data analytics, systems analysis and intelligence science; nuclear engineering and high-energy density science; advanced materials and devices; energy and water; bioscience for national security; and emerging science and engineering capabilities for national security.

“This continues our long-standing collaboration with UNM and is a big step forward in the partnership,” Diane said. “This allows Sandia to collaborate in an in-kind way with UNM faculty and students.”

For example, the CRADA will build on partnerships between Sandia and the university at the Center for Quantum Information and Control, co-located at UNM and the University of Arizona; at the Advanced Materials Laboratory, a research facility jointly operated by Sandia and UNM; and

at the New Mexico EPSCoR SMART Grid Center, a project that includes Sandia, UNM and several other research institutions.

Materials validated for Large Hadron Collider use

In one of the first projects under the umbrella CRADA, Sandia will test and validate electronics and other materials UNM uses to develop advanced particle detector designs for the Atlas Detector on the Large Hadron Collider at CERN, headquartered in Geneva, Switzerland. Atlas has been used in several well-known physics investigations, from the search for the Higgs boson to dark matter particles.

Electrical components and other materials need to withstand harsh radiation fields during experiments at the Large Hadron Collider, said Maryla Wasiolek, a Sandia nuclear engineer on the project. The collider is undergoing energy and luminosity upgrades that will expose particle detector components to higher levels of incident radiation.

The UNM components will be tested at Sandia’s Gamma Irradiation Facility and the Ion Beam Laboratory to predict their responses to the experimental conditions similar to those that may be present when the Large Hadron Collider restarts operations. The results will be shared with several programs requiring radiation-hardened detectors, electronics and materials.

Another project will allow Sandia to assist UNM researchers with characterizing fuel plates used to

power the university’s low-power teaching reactor, said Sandia engineer John Miller.

The project, supported by the DOE’s Criticality Safety Program, will support the development of benchmarks for the Nuclear Energy Agency’s International Handbook of Evaluated Criticality Safety Benchmark Experiments, which is used to validate nuclear data. Having those benchmarks, John said, will benefit both institutions and the nuclear community.

“In the world of nuclear criticality safety, we’re always trying to ensure people handle material in a safe manner,” John said. “We have the radiological protection people who can do the characterization, we have nuclear safety experts and we have the measurement capabilities that UNM needs, while they have a reactor with uncommon fuel.”

John pointed out that the UNM teaching reactor is a low-power reactor used for teaching and research: “If it was working at full capacity, it could barely power an LED.” LEDs are light-emitting diodes.

John said there’s a chance that once the project and associated training are complete, UNM could inherit surplus equipment from Sandia that would allow it to make additional measurements. That exchange of expertise, equipment and knowledge was a driving force for the agreement.

“We want to have these interactions with UNM and other universities to meld complementary skills in the pursuit of science,” he said. “We are excited to be working with UNM, bringing our expertise to help characterize their training reactor.” [!\[\]\(5ca7d0bd23567a9aa1f800590644baea_img.jpg\)](#)

Employees become entrepreneurs at inaugural Idea Sprint

By **Manette Newbold Fisher**

What if the wallet of the future fit in your ear like a wireless headphone?

Smaller than a smartwatch, it could access money using credit card, bank account and bitcoin data. On top of that, it would play music, store contacts, project holographic images of your photo IDs and charge wirelessly while you walk.

That was systems researcher and analyst Diana Bull’s idea at Sandia’s first Idea Sprint at the Lobo Rainforest, where a couple of dozen Sandia employees dove head first into entrepreneurial training. UNM’s Innovation Academy provided instructors for the two-day program that focused on product design, customer needs and communication.

On the first day, employees were divided into pairs to interview each other about the ideal wallet.

Project manager John Sandusky wanted coin storage he could access in 15 seconds. Manager David Sais’ idea was a drone wallet that could follow John around — charge on poles throughout the city — and duck down for easy access when he needs those coins.

The design prototypes were created with the same materials seen in an elementary school classroom: construction paper, stickers, tape, popsicle sticks, markers, sand paper, clips and Legos.

Prototyping gets ideas out of your head and into the world, said instructor Nancy Lewis of UNM Innovation Academy. It’s not as much about making the precise prototype as following the process, she said.

The Idea Sprint was put on by Sandia’s Entrepreneur Exploration program, which seeks to inspire entrepreneurial efforts through webinars, workshops, technology showcases and trainings.

Manager Jackie Kerby Moore, who opened the event, said the goal of the program is to invigorate an entrepreneurial culture and inspire Sandia researchers either to enter the business world or develop the innovative mindset while at the Labs. In 2018, four employees left the Labs to start small businesses and one left to expand an existing business.

While some Sandia employees came to the Idea Sprint with ideas they hope to commercialize later, others came to learn more about solving problems.

“I’ve been interested in design and conceptualizing solutions to problems



CREATIVE PROTOTYPING — Sandia postdoc Yuliya Preger tests her ideal wallet prototype that could be worn on the arm and carry all the essentials. Idea Sprint participants used simple supplies to design prototypes in a training program challenge. **Photo by Lonnie Anderson**

and this seemed like a great way to expand that skillset,” said mechanical engineer Dan Seegmiller.


Sandia business development specialist David Kistin said the Idea Sprint was planned to give Sandia employees exposure to tools that could reduce risk in the commercialization process.

Following the wallet exercise, participants were split into different groups to work on clear communication and pitches for different projects. Some groups chose to present ideas they’ve been working on at Sandia, while others focused on side projects.

The event ended with a friendly pitch competition. The winners, Keith Kozlowski, Marcos Sanchez and David Sais, pitched a children’s book that Keith has been working on outside of Sandia.

In two days, everyone improved product communication skills that could be transferred to multiple fields, both technical and creative, Keith said.

Both Keith and Diana said the takeaway was learning about Sandia’s entrepreneurial tools and resources.

“(The Idea Sprint) really gave people new ways to think about how to take their work to a larger audience, even if it’s not building a company,” Diana said. “I think as with most things in life, knowing about the resources is half the battle.” 

Thwarting oil-pipeline

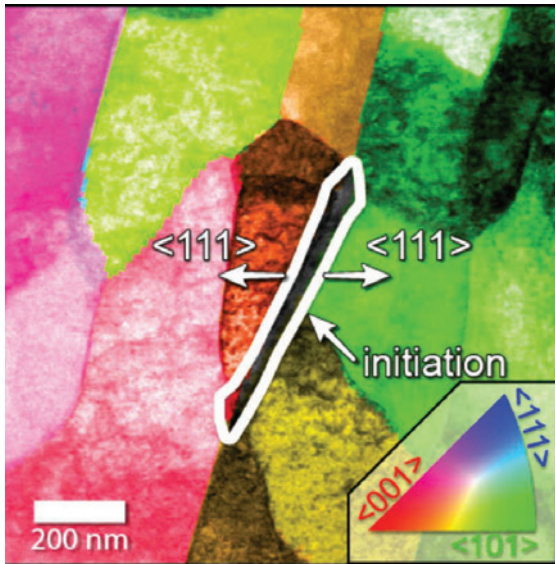
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In their experiments, the corrosive process stopped when the triple junction had been consumed by corrosion, but the crevice left behind allowed the corrosive solution to attack the interior of the steel.

“We thought of a possible solution for forming new pipe, based on changing the microstructure of the surface steel during forging, but it still needs to be tested and have a patent filed if it works,” said co-author and principal investigator Katherine Jungjohann, lead microscopist.

First observation of nanoscale corrosion

Aramco senior research scientist Steven Hayden added, “This was the world’s first real-time observation of nanoscale corrosion in a real-world material — carbon steel — which is the most prevalent type of steel used in infrastructure worldwide. Through it, we identified the types of interfaces and mechanisms that play a role in the initiation and progression of localized steel corrosion. The work is already being translated into models used to prevent corrosion-related catastrophes like infrastructure collapse and pipeline breaks.”



RUST MAP — A Sandia transmission electron microscope helped create this phase equilibrium map showing areas where corrosion of steel was observed at the triple junction formed where one cementite grain abuts two ferrite grains.

Micrograph courtesy of Katie Junjohann

To mimic the chemical exposure of pipe in the field, where the expensive, delicate microscopes could not be moved, very thin pipe samples were exposed at Sandia to a variety of chemicals known to pass through oil pipelines.

Sandia researcher and co-author Khalid Hattar put dry samples in a vacuum and used a transmission electron microscope to create maps of the steel grain types and orientation, much as a pilot might use a camera to create aerial maps

of farmland and roads — only Khalid’s maps had a resolution of about six nanometers, or six billionths of a meter.

“By comparing these maps before and after liquid corrosion experiments, a direct identification of the first phase that fell out of the sample could be identified, essentially identifying the weakest link in the internal microstructure,” Khalid said.

Co-author Paul Kotula said, “The sample we analyzed was considered a low-carbon steel, but it has relatively high-carbon inclusions of cementite, which are the sites of localized corrosion attacks.

Microscopes identified all the players

“Our transmission electron microscopes were a key piece of this work, allowing us to image the sample, observe the corrosion process and do micro-analysis before and after the fact to identify the part played by the ferrite and cementite grains and the corrosion product,” Paul said.

Hayden said that when he started working in corrosion research, “I was daunted at how complex and poorly understood corrosion is. This is largely because realistic experiments would involve observing complex materials like steel in liquid environments and with nanoscale resolution, and the technology to accomplish such a feat had only recently been developed and had yet to be applied to corrosion.


“Now we are optimistic that further work at CINT and Sandia will allow us to rethink manufacturing processes to minimize the expression of the susceptible nanostructures that render the steel vulnerable to accelerated decay mechanisms.”

The invisible path of localized corrosion

Localized corrosion is different from uniform corrosion. The latter occurs in bulk form and is highly predictable. The former is invisible, creating a pathway observable only at its end point and increasing bulk corrosion rates by making it easier for corrosion to spread.

“A better understanding of the mechanisms by which corrosion initiates and progresses at these types of interfaces in steel will be key to mitigating corrosion-related losses,” the authors observed in their highly readable paper.

Other authors include Sandia researchers William Mook and Daniel Bufford, along with former Sandia researcher and experimental lead Claire Chisholm, now at the University of California at Santa Barbara.

The work was funded in part by Sandia’s Laboratory Directed Research and Development program. CINT is a DOE Office of Science user facility jointly operated by Sandia and Los Alamos national labs for university, industry and other national laboratory researchers. 

A Day in the Life of Sandia

70 years and counting

A PHOTO ESSAY BY RANDY MONTOYA

This May 13 marked 70 years since President Harry Truman used the words “... exceptional service in the national interest” to describe his intent for Sandia. I’m sure he could not have known the challenge he set forth for the employees of that day, or for those of us in the 70 years that have followed. On the anniversary of the Truman letter, I photographed a single day of your work, hoping to capture how those words might still echo through our halls and test facilities after seven decades.

I’ve had the privilege of being the Lab News photo-journalist and documenting nearly half of Sandia’s life, 48% of it to be exact. Some may be skeptical that the Labs still have a role to play when faced with the tremendous challenges our nation has seen since Truman’s letter. However, on every step leading up to this project — and especially on that day — I found the same values I’ve witnessed since I arrived in 1986. We have labs and offices full of baby boomers, Gen Xers, millennials and centennials working together to serve the nation, eager to share their enthusiasm for their work and concerned with the well-being of those around them.

This photo essay is an incomplete work. I did all I could and only a fraction of what I wanted to do. Many more people contributed than those you see photographed. In Albuquerque, May 13 has more than 14 hours

of daylight, but I found that isn’t enough time to contain what happens here in a given day. It was a fantastic, busy day and, in total, seemed somehow more impressive, like stitching together a quilt that adds up to much more than the individual pieces. The photos are an attempt to take you on the journey with me. It’s easy to see, when you take time to really look, how many people around us are always trying in some way or another to live up to President Truman’s vision. I think Harry certainly would be astonished by our technical achievements, but I bet he also would be proud of the dedication of the support staff in enabling those accomplishments. You can show up at Sandia at any time and find people setting up tests, repairing, protecting, maintaining and preparing for the next day. It is this spirit of “we” that propels Sandia’s successes. This must be the easiest place I can think of to find people working closely together so they can do things better today than they did yesterday.

At times, words like “exceptional” seem overused, but as corny as it might sound, that word still resonates here daily. The words that once charted the course for our Labs no longer belong to President Truman, but to all of us who call ourselves Sandians.

Happy 70th birthday, everyone.

— Randy Montoya



Sunrise at Thunder Range test facility: Dustin Romero and Allen Gorby prepare the final stages of an extreme velocity gun test.



Sandians exercise before the sun comes up in a step aerobics class with instructor Amy Cincotta.



Bruce McWatters sets up the Cockcroft-Walton accelerator for what will be a week long neutron scattering test.



A view inside the 200-foot-tall solar tower is rare. Daniel Ray, lower right, shows the scale of the enormous facility as he sets up an experiment.



On her first day back from leave, Katie Jungjohann readies an experiment for the transmission electron microscope at CINT.



Firing the Hermes 3 accelerator requires arming a series of triggering lasers. Benjamin Hughes readies for a test beneath the world's largest gamma radiation simulator.

A B61-12 model goes through a vibration test to analyze structural integrity. Placing the diagnostics are Daniel Rohe, Patrick Hunter and Maxine Norton.



Ellen Homan delivers the Monday morning mail. Mondays are the busiest for mail deliveries.



Robert DeLaO aims his X-ray camera on Jennifer Chavez's hand at Sandia's onsite medical facility.



A Weapon Intern Program class learns about the MK-5 bomb from Erik McIntire.



Sandia's Thermal Test Complex is an international resource for validation of fire physics models. Anay Luketa reviews computer models for an upcoming test.



Security Police Officer Robert Ulibarri is on patrol at sunset near the water impact facility. He will be guarding Sandia with other security officers through the night.

Building health through better buildings: Sandia LEED campus efforts recognized

By **Jennifer Sawayda**

Sandia is the first corporate campus to receive the new Building Health Leadership Award, which recognizes its Leadership in Energy and Environmental Design v.4 Campus effort. Sandia is the largest DOE site named a LEED v.4 Campus.

The Building Health Leadership Award recognizes exceptional leadership for the proactive incorporation of health principles into the design, construction and operation of buildings. The award was developed through a partnership with the nonprofit U.S. Green Building Council, which promotes sustainable design and building principles, and the University of Virginia School of Medicine.

The Council’s LEED v.4 for Campus Certification is a framework for quantifying sustainability measures that contribute to LEED certification on a sitewide basis.

As part of its campus wide effort, Sandia’s facilities departments collaborated with Employee Health Services to develop an integrated process for health promotion to incorporate into the planning of new buildings.

“We worked with USGBC and the University of Virginia to develop a building occupant health risk assessment early in the planning process,” said strategic planner Alicia Brown, who worked with Lisa Teves and Jon Pier from Human Resources.

Award criteria are planning for health promotion, green building certification and measuring operational performance. Sandia was recognized for outstanding leadership in all three.

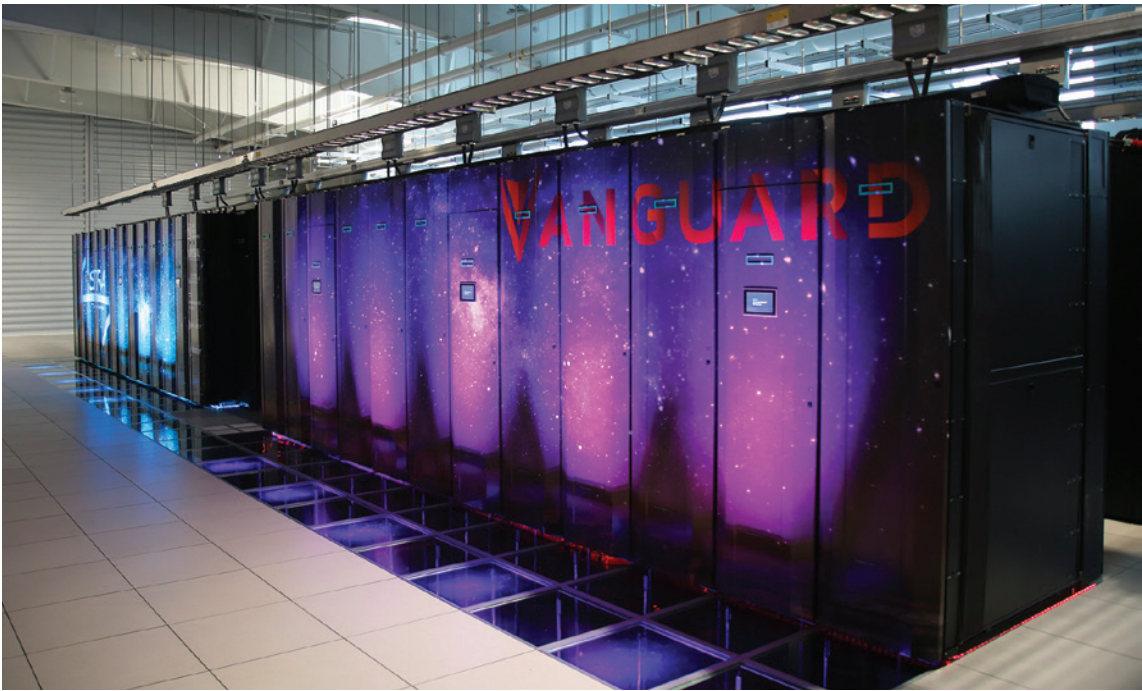
Employee wellness was incorporated into the planning process with an emphasis on increasing walkability and bike-ability.

To ensure the initiative is a success, Sandia will monitor and evaluate occupant health and sustainability metrics through post-occupancy surveys. EHS staff will help to incorporate health promotion strategies into the design of new buildings.

“Integrating health promotion with LEED design and construction principles on a campus wide basis acknowledges Sandia’s commitment toward a healthier and more sustainable work environment,” Alicia said.

LEED for Campus also provides reference criteria for future projects across the campus, allowing Sandia to maintain its LEED certification for new buildings and construction. The new high-performance computing facility is expected to be the first building certified under the LEED for Campus effort, as well as Sandia’s first LEED-certified data center. Alicia said LEED for Campus will provide 23 percent of LEED building prerequisites and credits when new projects are sited within the campus boundary.

Sandia and two other award winners were announced at the recent IMPACT conference. [!\[\]\(b4eeff342f60cc7bcd67d869b4fedca2_img.jpg\)](#)



LEEDING THE WAY — Some of the buildings that aided the Labs in achieving Leadership in Energy and Environmental Design v.4 for Campus Certification were completed recently and filled quickly with members of the workforce supporting Sandia’s mission. The top three photos display some of the features of the Labs new high-performance computing facility, which is expected to be the first building certified. **Top three photos at right by Lonnie Anderson. Bottom two photos courtesy of Facilities organizations**

Sandia NM, CA are 1-2 for fastest labs



Runners at both the New Mexico and California sites won top honors nationwide in a DOE-sponsored virtual mile race recently. Twelve labs hosted 1,232 participants running and walking one-mile races at their sites. The Sandia New Mexico men’s running team had the top score in the DOE with 45 points, followed by the Sandia California team (shown at top, racing the Lawrence Livermore team) with 64 points. The Sandia California men also won the walking division. The Sandia New Mexico women’s team placed third in the running event, and the California women’s running team placed fourth. Vicki Garcia of Sandia New Mexico won the national women’s race with a time of 5:41, with teammates Kelley Ruehl in second and Andrea Staid in fourth (middle photo, left to right). Karl Walczak of Sandia New Mexico (bottom photo, center, with Zach Casias, left, and Jeff Boyd, right) placed second in the men’s run with a time of 4:54, and Kyle Allen of Sandia California placed third just one second behind.

— by Lara Adams



Sandia author examines carbon storage in deep saline formations

By **Michael Padilla**

A new book co-authored and co-edited by Sandia experimental geochemist Anastasia Ilgen provides a comprehensive look at carbon storage in deep saline formations.

The volume, which was published recently by Elsevier, is entitled Science of carbon storage in deep saline formations: Process coupling across time and spatial scales.

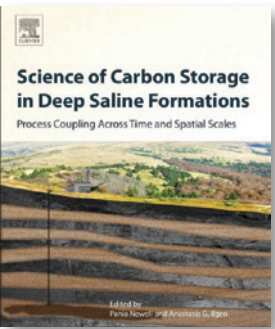
The 336-page publication, which was the effort of a multinational team, emphasizes how subsurface systems respond to the injection and storage of carbon dioxide. Chapters address individual and coupled processes related to two-phase fluid flow, thermal, geomechanical, microbiological, and geochemical phenomena over a wide range of temporal and spatial scales. The book addresses multi-scale and multi-physics aspects of geological carbon storage and is organized by discipline.

The book also highlights process coupling relevant to geological carbon storage and identifies future research needs.

“This work represents a comprehensive, one-of-a-kind book on the subject of carbon storage in saline formations,” Anastasia said.

Anastasia’s work at Sandia includes research into geological carbon storage, chemical-mechanical effects in geosystems and fundamental research on clay mineral-water interfacial chemistry.

Her co-editor, Pania Newell, developed computational models of subsurface carbon storage while at Sandia, before joining the faculty of the University of Utah.



The Coronado Thunderbird club meets on the second Tuesday of every month.

Call Connie DeFoe for information, 505-298-0330

SANDIA CLASSIFIED ADS

AD SUBMISSION GUIDELINES

AD SUBMISSION DEADLINE: Friday noon before the week of publication unless changed by holiday.

Questions to Michelle Fleming at 505-844-4902.

Submit by one of the following methods:

- EMAIL:** Michelle Fleming (classads@sandia.gov)
- FAX:** 505-844-0645
- MAIL:** MS1468 (Dept. 3651)

- INTERNAL WEB:** Click on the News Tab at the top of the Techweb homepage. At the bottom of the NewsCenter page, click the "**Submit a Classified Ad**" button and complete the form.

Due to space constraints, ads will be printed on a first-come, first-served basis.

MISCELLANEOUS

PIANO, Baldwin Acrosonic model 2054, pecan, pristine condition, \$1,250. Skocypiec, 822-1046.

ELECTRIC MOTORIZED WHEELCHAIR, Quantum Edge Q6, 14-in. solid belt tires, 2 direct drive motors & much more, originally \$35,000, asking \$3,000 OBO; sofa w/pillows, multi-colored, \$300 OBO. Mann, 505-401-0988.

FITBIT VERSA, 2, black, w/chargers, photos available, paid \$200 ea., asking \$100 ea. Pacheco, 505-816-8501.

TREADMILL, Sole F63 (2013), good condition, \$450. Valdez, valdez-jv07@msn.com.

SWIM SPA, 14' x 8", Cal Spa F-1437, brand new, int. white/grey, text/call for more info, retails for \$26,000, asking \$16,000 OBO. Miller, 505-980-9552.

TEXTILE LOOM, Harrisville Designs Inc., 36" x 4H x 4T, w/accessories, \$400; bike for ages 3-6, Islabikes Cnoc 14, \$150. Pocus, 505-400-7785.

REFRIGERATOR, LG model LTCS24223S, very good condition, kitchen remodeled, no longer fits, \$300. Dinge, 505-818-8933.

MOVING BOXES, heavy duty, small/medium size, \$100 or make offer. Archuleta, 303-601-8021.

OVERCOAT JoSBank, size medium, 3/4-length, like new; Sears hydraulic floor jack, 3-ton. Hill, 610-2436.

OFFICE DESK, w/2 bookshelves, beautiful, rustic, message for photos, \$575 OBO. Case, rcase1108@gmail.com.

‘BEAUTIFUL’ TICKETS, 2, June 15, orchestra seats, P115-P116, \$120. Eager, 505-299-6874.

TIRES, 4, 265-75-R16, w/6 lugs on factory aluminum wheels, \$120. Overall, 220-3200.

TRANSPORTATION

‘05 VOLVO XC70, 170K miles, great condition, \$3,000. Edenburn, 869-2911.

‘13 HONDA PILOT EX-L, many extras, always garaged, 1 owner, well-maintained, 66K miles, excellent condition, \$19,500. Roesch, 899-9145.

‘15 SUBARU IMPREZA WAGON, 35K miles, excellent condition, \$12,000 OBO. To, 505-553-1611.

‘07 HONDA ACCORD SE, gray, sole owner, 118K miles, good condition, \$4,000 OBO. Myers, cmyers136@gmail.com.

‘11 F150 XLT, supercrew cab, 4-dr., 4WD, red, backup camera, bedliner/cover, seats 6, chrome pkg., 86K miles, very clean, \$19,500 OBO. Cox, 505-200-1321.

‘10 FORD F150 LARIAT, 4WD, newer all terrain tires, new brakes, well-maintained, 127K miles, good condition, \$17,000. Geubelle, 505-379-4461.

‘07 LEXUS ES350, V6, 145K miles, good condition, clean, runs great, perfect for student, \$5,200. Nunez, 505-506-7619.

‘92 MAZDA MIATA CONVERTIBLE, classic, 5-spd., AC, PS, PW, red exterior, black interior, 102K miles, great condition, \$3,500. Waters, 505-366-3107.

‘17 SHELBY GT350, 5.3K miles, perfect shape, \$47,000. Evans, 505-238-6345.

RECREATION

VERTICAL TANDEM TRICYCLE, almost new, \$500. Taylor, jtlymtnest@aol.com.

‘07 KAWASAKI KLX 110, \$800; 15-ft. canoe, \$125; North Star SC850 cabover camper, crank-up shower, solar panel, \$3,800. Seals, 505-292-1367.

‘03 YAMAHA WR250F, electric start, runs great, makes excellent trail bike, \$2,250 OBO. Wilvert, 505-263-7761.

MOUNTAIN BIKES, East Mountains: men’s Mongoose MGX GRH 6.5; ladies MOTIV M Smoothie; have not used in years, \$165 ea. Willmas, 505-281-9124.

GT MOUNTAIN BIKE, w/Manitou suspension, \$150; new Italian leather loveseat, \$300. Logan, 459-5164.

SPOT WAZEE BICYCLE, 52 cm, 10-spd., belt drive, Alfine internal gears, disk brakes, ideal for commuting, accessories included, \$1,000. Sullivan, tdsulli@unmalumni.com.

‘17 HONDA CBR300, new condition, 4K miles, \$3,300 OBO; ‘00 Ford F150, manual, 2WD, 90K miles, \$3,700 OBO. Rankin, 505-239-6308, leave message.

REAL ESTATE

3-BDR. HOME, 2-1/2 baths, 2,148-sq. ft., wooded .99 acre, many updates, East Mountains, 30 min. to KAFB, \$319,000. Wise, 505-350-5014.

3-BDR. HOME, 1 bath, renovated, ~1,238-sq. ft., 11603 Summer NE, photos at Zillow.com, open house May 25, noon-4 p.m., \$171,000 OBO. Dubicka, irunia@hotmail.com.

2-STORY CONDO, see at https://tinyurl.com/y5rk-ac3s, \$139,900. Ramos, teresecarrillo@gmail.com.

3-BDR. HOME, 2-1/2 baths, 2,500-sq. ft., 1.1 acres, on quiet cul-de-sac, Sandia Park, \$385,000. Fish, 385-9303.

EAST MOUNTAIN LAND: 25 acres, residential, MLS#937418; 5 acres, off-grid, MLS#942641. Dotson, 505-850-2939.

2-ACRE HOMESITE LOT, w/1.5 adjoining commercial lot, Sandia Park, Highway N14, well, septic, electricity, phone, \$160,000. George, 505-507-1306.

WANTED

FISHING TACKLE BOX, good quality, w/ or w/o contents, preferable metal. Menicucci, 505-235-8501.

MUSICIANS, for community concert band: brass, woodwind & percussion, rehearsal Tuesday evenings. Bliss, 259-0131, ask for John.

AD RULES

- Limit 18 words, including last name and home phone (web or email address counts as two or three words, depending on length).
- Include organization and full name with ad submission.
- Submit ad in writing. No phone-ins.
- Type or print ad legibly; use accepted abbreviations.
- One ad per issue.
- The same ad may not run more than twice.
- No “for rent” ads except for employees on temporary assignment.
- No commercial ads.
- For active Sandia members of the workforce and retired Sandians only.
- Housing listed for sale is available without regard to race, creed, color or national origin.
- Work wanted ads are limited to student-aged children of employees.
- We reserve the right not to publish any ad that may be considered offensive or in poor taste.

Mileposts



*New Mexico photos by Michelle Fleming
California photos by Randy Wong*



Mary Ann Sweeney 45



Linda Gonzales 40



Ken Nunez 40



Douglas Adams 35



Ed Binasiewicz 35



Glenn Rackley 35



Ron Simon 35



Fernando Bitsie 30



Debra Browitt 30



Martrice Endres 30



Tracy Jones 30



Theodore Salas 30



Sharissa Young 30



Marc Gunkel 25



Norman Smith 25



Park Hays 20



Matt Hopkins 20



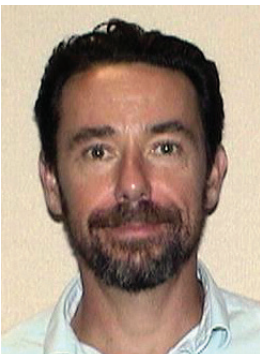
Matthew Kerschen 20



Heather Pennington 20



Karen Prinke 20



Jesse Roberts 20



Amber Romero 20



Jimmie Wolf 20



Craig Wood 20



Irene Allen 15



Carlton Brooks 15



Sean Brooks 15



Melissa Creange 15



William Evans 15



Melony Hildebrandt 15



Mark Johnston 15



Rodney Keith 15



Tabitha Kennedy 15



Izabel Nazario 15



Stefani Olcott 15



Tracy Peterson 15



Tiffany Pierce 15

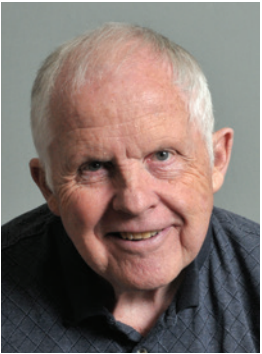


Jamie Richard 15

Recent Retirees



*New Mexico photos by Michelle Fleming
California photos by Randy Wong*



Ken Reil 43

Sandia revs its engines



Photos by **Randy Montoya**

The Labs' annual car show, which started out as a team-building activity for Logistics Operations, roared to life again at Sandia this spring for its sixth year. Held on the first Thursday in May, the show this year featured 52 cars and six motorcycles from members of the workforce around the Labs. 